

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 1; Jan 2024; Page No. 261-264

Received: 12-11-2023
Accepted: 22-12-2023

Indexed Journal
Peer Reviewed Journal

Socio-economic determinants of crop diversification in South Gujarat: An empirical analysis

¹Anjali S Chaudhari, ²Dr. Narendra Singh and ³Mayank J Patel

¹Ph.D. Scholar, Department of Agricultural Economics, N.M.C.A., N.A.U., Navsari, Gujarat, India

²Professor and Head, Department of Agricultural Economics, N.M.C.A., N.A.U., Navsari, Gujarat, India

³Agri. Assistant, Department of Agricultural Economics, N.M.C.A., N.A.U., Navsari, Gujarat, India

DOI: <https://doi.org/10.33545/26180723.2024.v7.i1d.219>

Corresponding Author: Anjali S Chaudhari

Abstract

The study delves into South Gujarat's agricultural landscape, a microcosm reflecting India's economic backbone reliant on agriculture. Over a 25-year period, the region witnessed a marked transition from traditional to high-value crops, evident in the dominance of cereals in specific districts, thriving pulses in others, and a prevalence of fruits and vegetables as primary horticultural produce. Through a multi stage sampling process involving 40 respondents across four villages in two strategically chosen districts, the study identified critical determinants of crop diversification. Education emerged as a positive influencer of crop variety, while accessible roads significantly correlated with increased sales, emphasizing the role of knowledge dissemination and infrastructure. This underscores the potential for commercially oriented agriculture, emphasizing the need to bolster education and infrastructure to further cultivate crop diversity, addressing both local needs and market dynamics, thereby bolstering agricultural development in the region.

Keywords: substituted Li ferrite, magnetostatic and spin waves, microstrip array antenna, X-band frequency range

Introduction

Agriculture and allied sector play a very important role in the economy of India. This is the main sector providing livelihood to more than two-third of country's population, especially in rural areas of our country. The economy has also witnessed shifting of consumption pattern from traditional cereals to a more holistic and nutritious diet of fruit and vegetables, milk, fish, meat and poultry products, and it is due to rapid growth of the economy. Hence, agricultural diversification towards high-value crops has been instituted within Indian agriculture.

The concept of diversification within agriculture may understood as shift from one crop (say rice) to another crop (say oilseeds) or from one enterprise (say crop raising) to another enterprise (say livestock). There are few major rationales behind the crop diversification which was very clearly elaborated by Vyas, 1996 [5]. crop diversification strategy is one of the most important risk management strategies in recent time as climate change and variability have posed serious challenges in front of the tropical and sub-tropical agriculture. Diversification strategy is a less expensive option in the hands of the farmers as other adaptation measures may require higher investment) because of this; farmers are diversifying (Intentionally or unintentionally) their cropping pattern in recent time to tackle the challenge of climate change and variability. Hence, this particular study was conducted in Gujarat (Gulati *et al.*, 2009) [1] to ascertain whether farmers of this region are diversifying their cropping pattern? And if they

are diversifying their cropping pattern, and the major determinants of crop diversification at the south Gujarat level. Gujarat's outstanding performance in agriculture can be attributed to factors such as diversified crops, advanced agricultural practices, climatic diversity, cooperative initiatives, and a strong marketing infrastructure. The state's agricultural growth is driven by cotton production, high-value crops, and livestock. With its diverse agriculture portfolio, Gujarat has emerged as a leader in the field of agricultural development. The paper suggests policy support in terms of enhancing these factors to promote crop diversification and agricultural development. The present study is planned with the following objectives as to achieve the development goals entitle with "Socio-economic determinants of crop diversification in South Gujarat: An empirical analysis".

Objectives

1. To examine the extent of crop diversification of selected districts of south Gujarat,
2. To study the socio-economic characteristics of the selected farmers of south Gujarat.

Data and Methodology

Gujarat has a total geographical area of about 161.98 lakhs hectares, with 61% of the geographical area under cultivation. Gujarat has 101 lakh hectare of Net Sown Area and 128 lakh hectares of total cropped area. The state is

divided into 4 region respectively central Gujarat, Northern Gujarat, Saurashtra and South Gujarat, are endowed with abundant natural resources, in terms of different kinds of soil, climatic conditions and diversified cropping patterns. Gujarat is purposively selected from India, the one of the fastest growing states of India. A study was conducted in Gujarat to assess the status of crop diversification in cereals, pulses, foodgrains, oilseeds, commercial crops and their sources on long term basis in context with changing climatic and economic conditions in the state. Out of four region of Gujarat south Gujarat is purposively selected for crop diversification, because of heavy rainfall region and higher cropping intensity.

Sampling Procedure: A multi stage sampling technique was used for drawing samples for the present study. In the first stage out of seven districts of south Gujarat region, two districts were selected purposively for study based on secondary analysis. Which districts have higher diversification observed. In the second stage out of total tehsil in the selected districts, one tehsil from each district were selected randomly. In the third stage out of total villages in the selected tehsils, two villages from each tehsil were selected randomly. In fourth stage a list of cultivators from these villages were prepared across farm categories. From the list, 40 cultivators were selected randomly that were treated as respondents. Through the random sampling 10 cultivators from each of the selected villages were selected as ultimate sample. Therefore total 40 respondents spread over 4 villages of 2 talukas was comprise as the ultimate sample for the study.

Data Collection

Both primary and secondary data were collected to fulfil the formulated objectives of the present study. Primary data were collected from the respondents using survey method. Data on different aspects was collected through structured schedules. Each of the respondents was approached personally for recording relevant data for the agricultural year 2020-21. Secondary data on area and production of important crops from 1996-97 to 2019-20 were collected from Directorate of Agriculture, Gujarat State, Gandhinagar. Also, area and production of Horticultural crops from 2005-06 to 2019-20 were collected from Director of Horticulture, Agriculture and Farmer welfare and co-operation Department, Government of Gujarat, Gandhinagar.

Secondary data were collected for South Gujarat region of different districts area.

Analytical tools and techniques

Crop diversification

Simpson Diversification Index (SDI)

It is the most suitable index for measuring diversification of crops in a particular geographical region and is calculated by Equation (2):

$$\text{Simpson Index (SI)} = 1 - \sum P_i^2$$

where, $P_i = A_i / \sum A_i$ A_i is the proportion of the i^{th} activity in acreage. If SDI is near zero, it indicates that the zone or region is near to the specialization in growing of a particular crop and if it is close to one, then the zone is fully diversified in terms of crops.

Socio-economic determinants: Socio economic determinants identify for the two highest diversified districts in south Gujarat. To analyse the socio-economic determinants Multiple regression model was used

Multiple regression analysis: Multiple regression analysis was used to identify the determinants of crop diversification. regression models were specified in their explicit forms as follows;

$$\text{Model: } Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + U$$

Where:

Y	=	Number of crops grown (actual number)
α	=	Constant term
$\beta_1 - \beta_7$	=	Regression coefficients
X ₁	=	Age of household head (years)
X ₂	=	Membership of cooperative society By household head (years)
X ₃	=	Years of education household head (no. of years)
X ₄	=	Total household farm size (ha)
X ₅	=	Experience in farming (number of years)
X ₆	=	Distance to a local market (Km)
X ₇	=	Annual returns from crop production
U	=	Error term

Results and Discussions

Crop diversification

Table 1: Measurement of crop diversification by average Simpson Diversification Index (SDI) during 1995-96 to 2019-20

Sr. No.	Crops	Bharuch	Narmada	Surat	Tapi	Navsari	Valsad	Dang
1	Total Cereals crops	0.98	0.97	0.92	0.85	0.58	0.55	0.82
2	Total Pulses crops	0.93	0.95	0.99	0.98	0.99	0.99	0.96
3	Total Oilseed crops	0.99	0.99	0.99	0.99	0.99	0.99	0.99
4	Total Cash crops	0.80	0.83	0.74	0.96	0.92	0.98	0.99
	Total Agricultural crops	0.72	0.75	0.66	0.79	0.50	0.53	0.78
5	Total Flower crops	0.99	0.99	0.99	0.99	0.99	0.99	0.99
6	Total Spices crops	0.99	0.99	0.99	0.98	0.99	0.99	0.96
7	Total Vegetable crops	0.98	0.98	0.95	0.91	0.98	0.99	0.92
8	Total Fruit crops	0.79	0.78	0.88	0.94	0.76	0.60	0.78
	Total Horticultural crops	0.23	0.24	0.17	0.16	0.27	0.41	0.34
	Total Agricultural +Total horticultural crops	0.76	0.80	0.75	0.83	0.71	0.74	0.81

Simpson Diversification Index for area under different crop groups of South Gujarat region. The Average of Simpson Diversification Index for different crop groups in south Gujarat different districts for the period of 25 years (1995-96 to 2019-20) is given in Table 1 If Simpson Diversification Index is closer to zero for a particular crop group, it indicates that the district is specializing in cultivation of that crop group. If the index is close to one then it indicates crop diversification. The average computed Simpson Index for the Agricultural crops showed high diversification observed in Tapi and Dang. The SDI value of both district is 0.79 and 0.78 respectively. While, low diversification observed in Navsari and Valsad with SDI value are 0.50 and 0.53 respectively. The average Simpson

Index for Both districts reflecting the extent of diversity in crops in the study area for agricultural crops. The average computed Simpson Index for the Horticultural crops showed high diversification observed in Valsad and Dang. The SDI value of both district is and 0.41 and 0.34 respectively. While, low diversification observed in districts Tapi and Surat with SDI value are 0.16 and 0.17 respectively. The results also showed overall diversification (agricultural crops + horticultural crops) for south Gujarat region. Overall higher diversification observed in Tapi and Dang Districts with SDI value 0.83 and 0.81 respectively.

Socio-economic Determinants

Table 2: Socio-economic Determinants of crop diversification

Variables	Regression Coefficient	Standard Error	T value
Constant term	7.203	0.728	000
age of household head	2.238	0.019	0.095***
Membership of cooperative society by household head	-2.821	0.067	0.654
years of education household head	5.278	0.040	0.040**
Total household farm size	1.276	0.245	0.425
Experience in farming	2.245	0.234	0.037**
distance to a local market	-1.687	0.567	0.721
Annual returns from crop production	-1.069	0.003	0.083***
R ²	0.57		

*=Significant at 10% level,
 ** = Significant at 5% level,
 *** = Significant at 1% level,
 NS = Not significant,

To study the socio-economic characteristics of crop diversification farm level survey was conducted in two districts of south Gujarat. The selected districts based of higher SDI value which are Dang and Tapi respectively. From the regression analysis from the regression analysis on Table 2, 57% of the variation in the number of crops grown was explained by the variables included in the model. The age of the head of the family affected the quantity of crops grown. This suggests that farmers experiment with different crops as they acquire greater expertise over time. The quantity of crops grew was positively correlated with the educational attainment of household heads, underscoring the value of knowledge and the capacity to learn new information from sources such as extension services. The head of the household's capacity to learn new talents and develop work-related skills both rise with the number of years of education he has received. Therefore, it is anticipated that increasing education levels will result in more commercially oriented agriculture, a higher production of value crops, and a greater involvement in non-farm activities.

Ultimately, a wider variety of cropping patterns is anticipated in remote families to accommodate a range of household consumption needs. A household head who lives next to an impassable road (poor road) sells less agricultural product than one who lives next to a road that is passable (good road) throughout the year (Minot *et al.*, 2006) [4]. A well-maintained road system also encourages diversification due to its low marketing costs, ease of commodity disposal, decreased risk, and decreased post-harvest losses. Low profit may encourage farmers to diversify into new crops with an expected better return, whereas high profit means

less diversification to other crops. The results obtained by Joshi *et al.*, (2003) [2] support this.

Conclusion:

In conclusion, the study of crop diversification in the South Gujarat region over a 25-year period reveals significant variations across districts. The Simpson Diversification Index (SDI) highlights Tapi and Dang districts as exhibiting higher diversification, particularly in both agricultural and horticultural crops. Conversely, Navsari and Valsad show lower diversification trends. The socio-economic analysis indicates that factors such as the age and educational attainment of household heads significantly influence the quantity of crops grown.

Furthermore, the accessibility of well-maintained road systems emerges as a key determinant of diversification, with good roads facilitating market access, reducing risks, and minimizing post-harvest losses. The findings underscore the interplay of geographical, socio-economic, and educational factors in shaping cropping patterns. To foster sustainable diversification, targeted interventions in education, infrastructure development, and market access are recommended, particularly in districts with lower diversification.

References

- Gulati A, Shah T, Ganga S. Agriculture performance in Gujarat since 2000: Can it be a Divadandi for other States? New Delhi: Internation Food Policy Research Institute; c2009.
- Joshi PK, Gulati AA, Birthal PS, Twari L. Agriculture diversification in South Asia: Pattern, determinants and

- policy implications. Discussion Paper No. 57. Market structure studies division. International Food Policy Research Institute. Washington D.C; c2003.
3. Minot N. Effectiveness of transaction cost on supply response and market surplus: Simulation using non-separable household models. Discussion paper No. 36. Market Structure Studies Division, International Food Policy Research Institute Washington D.C; c1999
 4. Minot N, Epprecht M, Anh TTT, Trung LQ. Income diversification in the northern uplands of Vietnam': Research report No.145. International Food Policy Research Institute, Washington D.C; c2006.
 5. Vyas VS. Diversification of agriculture: Concept, rationale and approaches. Indian Journal of Agricultural Economics. 1996;**51**(4):636-643.